

## Claims

- 1 A method of controlling an exhaust filter regeneration regime in which fuel is injected into an exhaust stream to increase exhaust stream temperature in conjunction with a catalytic treatment element, the method comprising the step of metering fuel injection dependent upon the exhaust stream temperature.
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- 2 A method as claimed as claim 1 in which the fuel injection is metered by controlling one of the fuel injection rate, fuel injection pulse duration, amount of fuel injected, fuel injection pressure variation, injected fuel type variation.
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- 3 A method as claimed in claim 1 or claim 2 in which the exhaust stream temperature comprises the temperature of the exhaust stream at the outlet of the catalytic treatment element.
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- 4 A method as claimed in claim 3 in which fuel injection is further metered dependent upon the temperature of exhaust gas exiting the engine and the temperature at the inlet of the catalytic treatment element.
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- 5 A method as claimed in any preceding claim comprising initiating fuel injection into the exhaust stream when the filter load exceeds an initiation value.
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- 6 A method as claimed in any preceding claim in which fuel injection is terminated upon any of: filter load reducing to a predetermined

determination threshold, catalytic treatment element temperature reducing below or exceeding a termination threshold or regeneration regime period exceeding a time threshold.

- 5      7    A method as claimed in any preceding claim further comprising recording a regeneration regime history and modifying the regeneration regime based on the recorded history.
- 10     8    A method as claimed in any preceding claim further comprising the step of pre-heating with vehicle waste heat fuel to be injected.
- 15     9    A method as claimed in any preceding claim in which fuel is mixed with compressed air in an injection head prior to injection into an exhaust stream.
- 20     10   A method as claimed in claim 9 in which supply of fuel to the injection head is terminated a predetermined instant prior to termination of compressed air supply.
- 25     11   A method of triggering an exhaust filter regeneration regime comprising obtaining a value of filter load as function of filter pressure and exhaust mass flow and triggering a regeneration regime when the filter load exceeds a predetermined value.
- 12   A method as claimed in claim 11 comprising the step of initiating fuel injection into the exhaust stream upon triggering the exhaust filter regeneration regime.

- 13 A method of triggering an exhaust filter regeneration regime comprising monitoring filter pressure peak values, identifying when a filter load exceeds a predetermined value from the monitored peaks and triggering a regeneration regime.  
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- 14 A method of triggering an exhaust filter regeneration regime in which fuel is injected into an exhaust stream to increase exhaust stream temperature in conjunction with a catalytic treatment element comprising obtaining a value of catalytic treatment element temperature and triggering the regeneration regime when the obtained temperature exceeds a predetermined value.  
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- 15 A method as claimed in claim 14 further comprising obtaining a value of the filter load as a function of the filter pressure and exhaust mass flow and triggering the regeneration regime when the filter load exceeds a predetermined value.  
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- 16 A method of controlling an exhaust filter regeneration regime comprising implementing an exhaust stream temperature control strategy, monitoring variation in exhaust stream temperature and at least one control parameter, obtaining a correlation between variation in exhaust stream temperature and the control parameter and adjusting the temperature control strategy based on the collation obtained.  
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- 17 An exhaust filter regeneration apparatus comprising a fuel injector arranged to be mounted in an exhaust stream conduit and a controller for  
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controlling the fuel injector to implement a method as claimed in any preceding claim.

- 18 An exhaust filter regeneration apparatus comprising an exhaust stream conduit and a fuel injector mounted therein and arranged to inject fuel in an exhaust stream direction.
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- 19 An exhaust filter regeneration apparatus as claimed in claim 18 in which the fuel injector includes a fuel input channel and an air input channel, each channel having an output end, whereby the output ends of the air and fuel channel are provided adjacent one another at a fuel injection output.
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- 20 An exhaust filter regeneration apparatus as claimed in claim 19 in which the fuel input channel is connected to a fuel pump and the air input channel is connected to a compressor.
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- 21 An exhaust filter regeneration apparatus as claimed in claim 20 in which said fuel pump is a peristaltic pump.
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- 22 An exhaust filter regeneration apparatus as claimed in claim 20 whereby said compressor is arranged to operate in the pressure range of 2 to 200 bar.
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- 23 An exhaust filter regeneration apparatus as claimed in any claims 17 to 22 having an electrical heater located before an exhaust gas input face of the catalytic treatment element.

- 24 An exhaust filter regeneration apparatus as claimed in claim 23 where  
said electric heater is formed of a catalytic treatment element.
- 5       25 An exhaust filter regeneration apparatus as claimed in any of claims 17 to  
24 in which the fuel injector draws fuel directly from the vehicle fuel tank or  
fuel line.
- 10      26 An exhaust filter regeneration apparatus as claimed in any of claims 17  
to 25 further comprising an exhaust filter component and a sensor  
extending radially therein.
- 15      27 An exhaust filter regeneration apparatus as claimed in any of claims 17 to  
26 further comprising a fuel conduit for providing fuel to the fuel injector in  
which the fuel conduit is preheated by any waste heat.
- 20      28 An engine or vehicle including an apparatus as claimed in any of claims  
17 to 27.
- 25      29 A computer programme comprising a set of instructions configured to  
implement the method as claimed in any of claims 1 to 16.
- 30 A computer arranged to operate under the instructions of the computer  
programme as claimed in claim 29.

31. An engine control unit configured to implement a method as claimed in any of claims 1 to 16.

5       32. A computer readable medium storing a set of instructions to implement a method as claimed in any of claims 1 to 16.

33. A method or apparatus substantially as described herein with reference to the drawings.